Met Office

NEWS

Rise in carbon dioxide off track for limiting global warming to 1.5°C

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The increase of atmospheric carbon dioxide (CO_2) is now incompatible with IPCC pathways which remain below 1.5°C, a Met Office study finds.

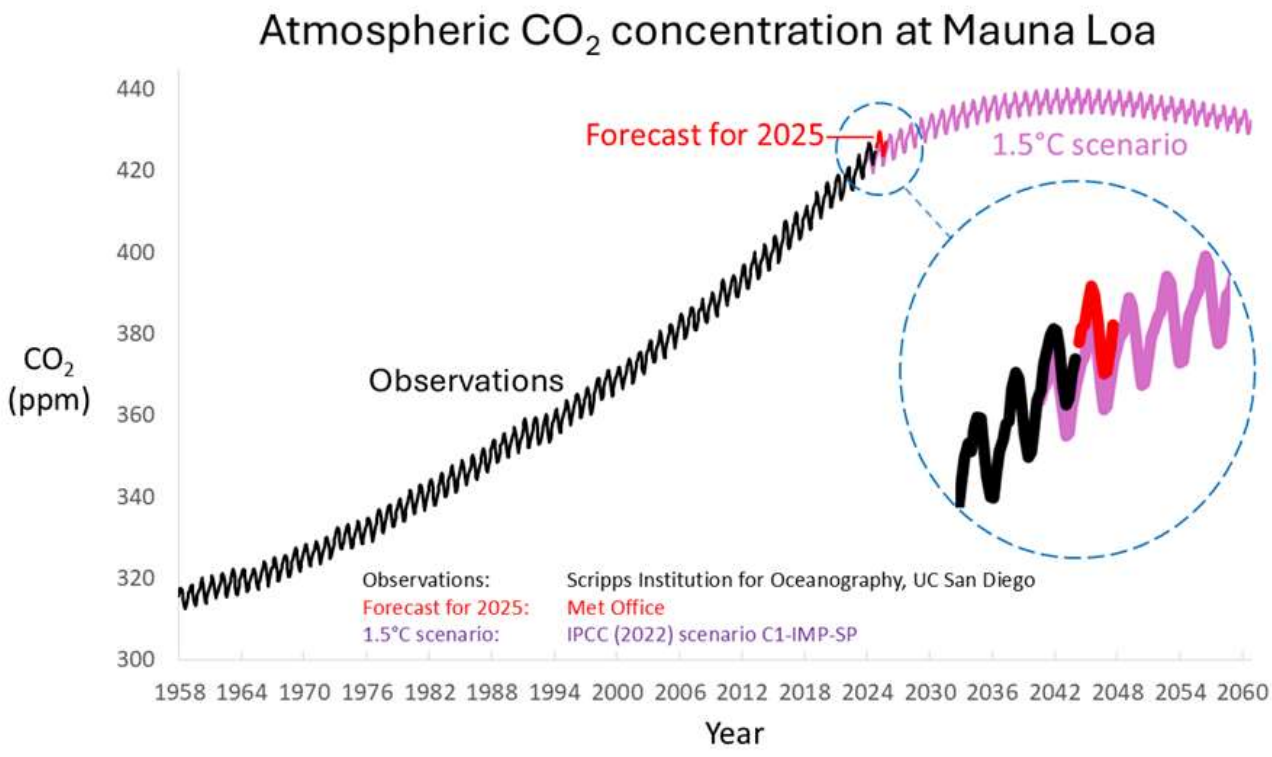
Last year saw the fastest annual rise in atmospheric CO_2 concentration in the long-running record of measurements at Mauna Loa, Hawaii, which started in 1958. The measured rise of 3.58 parts per million (ppm) exceeded the Met Office's prediction of 2.84 ± 0.54 ppm.

Satellite measurements also showed a very large rise across the globe, due to the impact of record high emissions from fossil fuel burning being magnified by weaker natural carbon sinks – such as tropical forests - and exceptional wildfires. These were due to widespread hot, dry conditions, partly linked to El Niño and partly to other factors including climate change.

But if global warming is to be limited to 1.5°C, the build-up of CO_2 in the air already needs to be slowing to 1.8 ppm per year, according to calculations used by the IPCC (Intergovernmental Panel on Climate Change).

The CO_2 rise between 2024 and 2025 is forecast to be less extreme than last year at 2.26 ± 0.56 ppm, due to a partial re-strengthening of carbon sinks linked to a shift from El Niño to La Niña conditions.

However, even this slower rise will still be too fast to track the IPCC's scenarios that limit global warming to 1.5°C with little or no overshoot.



The build-up of CO_2 and other greenhouse gases in the atmosphere has already heated the climate to damaging levels. Professor Richard Betts, who leads the production of the forecast, said: “Last week, it was confirmed that 2024 was the warmest year on record, with annual average temperatures higher than 1.5°C above pre-industrial levels for the first time. While this does not represent a failure to achieve the Paris Agreement target, as that would require breaching warming 1.5°C over a longer period and we may see a slightly cooler year in 2025, the long-term warming trend will continue because CO_2 is still building up in the atmosphere.”

“He added: “La Niña conditions are expected to cause forests and other ecosystems to soak up more carbon than last year, temporarily slowing the atmospheric CO_2 rise. However, stopping global warming needs the build-up of greenhouse gases in the air to come to a complete halt and then start to reduce. Large, rapid emissions cuts could limit the extent to which global warming exceeds 1.5°C – but this needs urgent action internationally.”

Keeling Curve

The Met Office Carbon Dioxide forecast has been produced since 2016.

The “Keeling Curve” record of atmospheric levels of carbon dioxide at Mauna Loa has been maintained by the Scripps Institution for Oceanography, University of California San Diego since 1958. Satellite measurements of the average concentration in the global atmosphere since 2003 are published by the Copernicus Climate Service.

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